

Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.

1.9
R53Fa

UNITED STATES
DEPARTMENT OF AGRICULTURE
LIBRARY



BOOK NUMBER

1.9
R53Fa

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

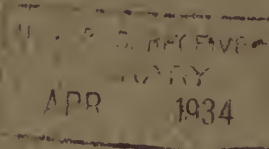
Prepared April, 1928

FEDERAL AID AS A ROAD BUILDING POLICY

1. WHAT IS IT AND WHAT HAS IT ACCOMPLISHED?
2. IS IT AID OR COOPERATION?
3. DO SOME STATES PAY MORE THAN THEY RECEIVE?

By - Thos. H. MacDonald, Chief,
and

H. S. Fairbank, Assistant to the Chief,
U. S. Bureau of Public Roads



FEDERAL AID AS A ROAD BUILDING POLICY

WHAT IS IT AND WHAT HAS IT ACCOMPLISHED?

Section 1

By Thos. H. MacDonald, Chief,
and
H. S. Fairbank, Assistant to the Chief,
U. S. Bureau of Public Roads.

With the passage of the Federal-aid Road Act and its approval by the President on July 11, 1916, the United States entered upon a policy of highway construction under the joint supervision and at the joint expense of the Federal and State governments which has come to be known as the Federal road policy.

The immediate and, in some respects, the most important result of the new policy was that it led to the creation of highway departments in all States. The establishment of such State agencies was required by the act as a condition precedent to the extension of Federal cooperation; and there was the additional requirement that the highway departments established should have immediate control and supervision of the construction of the roads in which the United States put its money.

There were still at that time seventeen States in which there was no State agency for highway construction and no interest on the part of the State government in the improvement of the roads. The counties in these States still had sole jurisdiction over all highways, and such works of improvement as were carried out at all were administered by numerous county

officials with little regard for the coordination of the projects and plans of the individual counties even within the boundaries of a single State. At State borders all semblance of concerted effort ceased.

In a number of other States there was some sort of State agency, but the powers and duties with which these early highway departments were endowed were generally those of advice and engineering assistance only. The control of the work of road construction and maintenance was still vested in county officials who were at liberty to seek and accept the proffered advice or not, as they might elect; and although the reward of State financial assistance was held out as an inducement it was not always sufficient to overcome the skepticism of the local officials, jealous of their century-old prerogatives and decidedly engineer-shy. Nor was the State's advice particularly effective even when it was accepted; the initiative still rested with the counties, both as to the roads to be improved and, by their right of refusal, as to the character of the improvement, and this effectively prevented the development of a consistent improvement program.

A few of the more advanced States had competent State engineering agencies adequately equipped and manned, and fully

empowered to develop the improvement of the more important roads of the State in accordance with an orderly and consistent plan.

Central Control Completes Main Highways

This was the status of highway administration in 1916 when the Federal-aid policy was adopted. It was only twelve years ago, as time is measured by the calendar; but, in all that pertains to roads and the use of the roads it was of another era. The States of New York and Pennsylvania now have as many motor vehicles as there were then in the entire country; where now the average motorist is accustomed to drives of hundreds of miles over continuously improved highways, such a journey outside of very limited areas would then have been attended by the most discouraging difficulties. The difference is the result of twelve years of centralized control and engineering administration of the main State roads; and the Federal-aid act was not only the cause of this reform in many of the States, but is probably the only force that prevents a return to the old methods of local administration in several.

In 1916 there were 287,000 miles of surfaced roads in the entire country. Now the surfaced roads are estimated at 585,000 miles and the annual construction exceeds 40,000 miles. Of this annual program the portion in which the Federal

Government participates directly averages less than 9,000 miles; so, we do not wish to attribute the acceleration of the road improvement movement to the Federal-aid policy. The credit for that belongs to the motor vehicle, and there would probably have been as great an increase in the mileage of improved roads if there had been no Federal aid as there has been with it. What we do assert - and that without hesitation - is that, as a result of the Government's participation and the inevitable concomitants of that participation a high degree of order and harmony has been brought into what would otherwise have been at best a discordant, and at worst a planless, expenditure of effort.

The requirements of the Federal law and administration have been the strongest forces at work to effect a concentration of the State highway expenditures on the really important roads. With few exceptions the idea of such concentration had not taken root in any State in 1916. Although the original Federal act did not require it, one of the first administrative acts of the Bureau of Public Roads was the request that each State highway department designate and file with the Bureau at Washington a limited system upon which it would confine its Federally-aided constructive effort. Later, when the original act was amended in 1921, the expenditure of the Federal

appropriations was limited strictly to the Federal-aid system established by the act - a system restricted to not more than 7 per cent of the total mileage of road in all States. By that time the wisdom of such restriction, first recognized and applied in a few of the more advanced States, then expounded and preached by the Federal bureau, had received practically universal acknowledgment. Becoming finally an absolute requirement of the Federal law, this concentrative policy, is responsible to a greater extent, perhaps, than any other cause for the present continuity of main road improvement. Without it there would have been such a scattering of effort that we would now be not much nearer the ideal of consistent, continuous, and well balanced road improvement than we were in 1916.

The Federal Agency of Highway Common Denominator

The participation of the Bureau of Public Roads with the State agencies in all States makes it the common denominator of the State fractions which make up the sum of national road building effort. It has served to disseminate a knowledge and practice of successful methods and to bring about the abolition of inefficient and uneconomic practices. It has been responsible for a standardization of construction and administrative policies at a level which tends to approach the highest. The co-partnership existing between the Federal

bureau and each of the State highway departments has been the binding force which has kept the highway officials of the country to a community of effort. It has given to their official organization, the American Association of State Highway Officials, the dignity and force of a highway congress with the will and the ability to frame and put into effect the measures of interstate cooperation required by the increasingly interstate character of highway traffic, a result of the utmost importance for the common good.

The close association of the Federal organization with those of the States and the wise and ample support which the Congress has given to the research activities of the former, has enabled it to perform the functions of the testing laboratory for the highway business of the country at large. Experimenting with new processes, testing materials, measuring destructive forces and seeking new and better ways of combating them, performing these services itself and encouraging others by its example and cooperation to do likewise, the Federal bureau has contributed heavily to the development of the modern science of road building, the applications of which are seen in the superior service and durability of the roads of today. PUBLIC ROADS, the journal of highway research in which it publishes monthly the results of its tests and investigations, is the guide, philosopher

and friend of the designing and construction engineer - and not in the United States only, but throughout the world. It gives them regularly views of the latest advances in their profession and keeps them constantly abreast of the developments which are taking place in their basic science; and so enables them to improve the efficiency and economy of their work.

To these important results of the Federal-aid policy may be added - not by any means as the least - the liberation of the constructive forces from local political influence and obstruction. To the extent of the work in which the Government has directly cooperated this liberation has been practically complete; and the example thus upheld has had its effect upon the general complexion of the entire highway industry. What has been done in road building in the United States in the last dozen years is an engineering feat of the first magnitude, performed with a degree of efficiency, businesslike management, and freedom from political manipulation, seldom, if ever, equalled in public work. And the fact that it can be thus characterized without reservation is due in no small measure to the Federal Government's participation.

Finally - and this we are not disposed to over-emphasize - the Federal aid has contributed to the building of 70,000 miles of the most important roads of the country at a cost to the

Government of \$600,000,000 - less by half a billion dollars than the amount which the same Government has collected in excise taxes on motor vehicles since 1917. Practically all of this improved mileage is within the Federal-aid system, a network of only 186,000 miles which nevertheless reaches directly practically every city and town in the country having a population of 5,000 or more. As the States alone, without Federal assistance, have improved at least an equal mileage of the system it will be seen that the progress already made has brought us well within sight of the initial improvement of the entire system.

What is the Federal-Aid Plan?

What is the Federal-aid road plan that has brought these things about, and how is it administered? In its original form, as it was established in 1916, it was a plan for the encouragement of road improvement under State direction. Upon the condition that each State would create a State highway department adequate in the opinion of the Secretary of Agriculture to supervise the road work to be done, the Federal Government proposed to apportion to them an appropriation of \$75,000,000 to become available in sums of increasing amount in each of the five years between 1917 and 1921. The amount appropriated for the first year was \$5,000,000, a small beginning consistent with the ability of the States to expend it

wisely. For the second year the amount appropriated was \$10,000,000, for the third it was \$15,000,000, for the fourth \$20,000,000, and for the fifth it reached the maximum of \$25,000,000, making a total of \$75,000,000 for the five years.

The apportionment of these sums to the several States was not entrusted to human judgment. It was inflexibly fixed according to a mathematical formula, the factors of which were designed to recognize the variable needs of the States. This formula, which is still followed, requires first the deduction of a small administrative percentage - now $2\frac{1}{2}$ per cent - from the appropriation and the division of the remainder into three equal parts, one of which is then apportioned among the 48 States and the Territory of Hawaii in proportion to their respective land areas, the second in proportion to their population as shown by the latest available Federal census, and the third in proportion to the mileage of post roads and star routes in each as certified by the Postmaster General. The sum of the three parts falling to each State makes up the total apportionment which the State receives, except that the share of those States which would thus receive less than one-half of one per cent of the whole, appropriation is increased to that amount and the apportionments

of the other States are adjusted accordingly. Five commonwealths benefit by this provision. They are the small States of Delaware, New Hampshire, Rhode Island and Vermont, and the Territory of Hawaii.

The sums thus set apart to their credit were available to the States under the provisions of the original act for the improvement of rural post roads, defined as "any public road over which the United States mails now are or may hereafter be transported," exclusive of streets in towns having a population of 2,500 or more with certain exceptions based upon the distance between abutting houses. It will be seen that this was a wide-open definition. Practically any rural road in the United States would answer the description, and it was so intended. There was no thought at that time in Congress of restricting the Federal assistance to the main roads. The purpose of the legislation and the end that it immediately accomplished was that of encouraging road improvement under adequate State engineering supervision. Later, as has already been remarked, the idea of restriction was introduced administratively by the request of the Bureau of Public Roads that the State proposals be confined to a definite limited system, and finally in 1921 this idea was incorporated in the law.

Initiation of Projects Rests with the States

From the beginning the initiation of projects upon which the Federal assistance is to be sought has rested with the States. The State highway department decides where, and when, it will undertake cooperative projects and submits to the appropriate district engineer of the bureau, of which there are twelve, definite proposals in the form of project statements or descriptions detailing the location of the sections of roads which it would like to improve, the character and amount of the traffic, the general type of improvement contemplated, and other pertinent information. The difference between the early and the later practice in this regard is simply that whereas formerly the State department was free to propose practically any road for improvement, it may now propose only sections of road which are included in the designated, limited system.

Upon receipt of the State's proposal, the Federal district engineer, if he has not already done so, makes an inspection of the road concerned and reports to the headquarters office his judgment as to the importance of the improvement and the adequacy of the type proposed by the State. If he believes the project to be desirable from the Federal viewpoint, and the headquarters office and Secretary of

Agriculture agree with him, the State highway department is notified that the project is acceptable, and the State then prepares to submit definite plans and specifications for the proposed work.

These are subject to the review of the bureau engineers and the approval of the chief of bureau, and when, finally, the State and Federal agencies are agreed, a definite legal agreement is drawn up by which the two parties agree to co-operate and share the cost, the Federal share being limited to not more than 50 per cent of the cost of the labor and materials involved.

Red Tape Delays Avoided

To avoid unnecessary delay, the State is not required to postpone the letting of contracts and the commencement of the construction work until the agreement has been signed. It may proceed at any time after the plans and specifications have been approved by the bureau's district engineer, with the understanding that if, for any reason, the Secretary of Agriculture should fail to ratify the project, the State will either modify it, or withdraw it and carry it out without Federal cooperation.

Besides being limited to one-half the cost, the extent of the Federal participation is also qualified by a limitation

of the amount that can be expended per mile. This limit, first set at \$10,000 per mile exclusive of the cost of bridges more than twenty feet in length, was changed after the world war to \$20,000 in recognition of the general increase in prices, and later was reduced to \$15,000 per mile, the current limit.

It will be clear, therefore, that if the total cost of an improvement at present exceeds \$30,000 per mile exclusive of the cost of bridges more than twenty feet in length, the Federal share can not be as great as 50 per cent of the cost; and this together with the circumstance that the amount of Federal cooperation requested by the State is in some cases less than 50 per cent accounts for the fact that the average payment by the Government on the roads built to date amounts to only about 43 per cent of their cost. The State pays the balance, and the Federal law requires that the funds from which such payment is made must be subject to the complete control of the State.

The actual construction in nearly all cases is done by contract let to the lowest responsible bidder, and the immediate supervision of the work rests with the State highway department subject, however, to regular inspection by the Federal engineers, and to the approval of the bureau. The

contractor is paid in full by the State, which is then reimbursed by the Federal Government to the extent of the Federal share, and no money is paid from the Treasury at Washington until the work upon which it is due has been completed to Federal satisfaction.

Maintenance Assured

After completion, the Federal-aid roads are maintained by the States which pledge their good faith to keep them in repair. They are inspected at least twice a year by engineers of the bureau, and if there is evidence of the need of repairs, that need is called to the attention of the State highway department; and the department is expected within ninety days of the receipt of the notice to put the road in a proper condition of maintenance. If it fails to do so the Secretary of Agriculture is authorized and directed by the law to perform the necessary work and deduct its cost from whatever balance of the appropriation there may be available to the credit of the State, and to refuse to approve new projects in the State until the amount paid has been refunded, such refund to be apportioned among all the States in the same manner as the original appropriations, so that the offending State would lose all but its pro-rata share. It is indicative of the generally high character of the

maintenance work of the States that it has not yet been necessary in any case to enforce this section of the law to its full extent.

With the exception of the provision requiring the designation of the Federal-aid highway system, which was carried by the Federal Highway Act of November 9, 1921, none of the several amendments of the original act has made a fundamental change in the policy and methods it laid down. But this one amendment put into effect a totally different idea of the purpose of the Federal aid.

Immediate Improvement Of Main System The Present Purpose

The 1916 law was designed to encourage road improvement in backward States and to develop competent and adequate engineering control in all. The 1921 act had for its purpose the improvement of a main interstate and intercounty system of highways covering the United States in the shortest possible time. To accomplish this it required the State highway departments, in cooperation with the Bureau of Public Roads, to designate such a system, setting as a limit upon its extent a mileage equal to 7 per cent of the total mileage of roads then existing in the States; and it provided that, thereafter, the Federal appropriations could be expended only for the

improvement of parts of the designated system.

There was no intention that the roads comprising this system should be improved only with Federal participation. On the contrary it was expected that the States would apply their independent efforts also toward its improvement, and the fact that substantially as much of the system has been improved by the States without Federal aid as with it, shows that the law has not been so interpreted. Nor was it the intention permanently to limit the Federal participation to 7 per cent of the country's road mileage. It was believed that a well chosen system of main arteries consisting of that percentage of the total road mileage, if it were consistently and adequately improved, would serve the more important needs of interstate and intercounty transportation; and the requirement laid down by Congress was designed to accomplish this end at the earliest possible date and before attempting to develop a larger mileage. But when provision has been made by any State for the completion and maintenance of the entire original 7 per cent system the act permits the State highway department, with the approval of the Secretary of Agriculture, to add additional mileage upon which subsequent Federal appropriations may be expended. In the three small States of Delaware, Maryland and Rhode Island this has already been done, which means that in these States the

original 7 per cent mileage has been fully improved and the improved system is now being extended.

The Special Obligation To The Public Land States

One other important change in the provisions of the original act, made by the subsequent amendments, has been of special benefit to the sparsely settled Western States, Large portions of some of these States are still owned by the Federal Government as national parks and forests, as Indian reservations and national monuments, and simply as unappropriated public land. None of these lands is subject to taxation by the States. The extreme case is that of Nevada where the Government still owns three-fourths of the land in the State. In Utah the Federal ownership extends to more than half the State's area, and in other States there are lesser percentages of public land.

When these States, with their large areas of non-taxable land, were required to match the Federal appropriations on a 50-50 basis it was soon found that they would not be able to support the burden. The basis was inequitable; and in order to correct it the law was amended so as to permit the Federal Government to pay more than 50 per cent of the cost of the roads built. The increased percentage was adjusted to the

amount of publicly owned land in each of the States by providing that the general Federal limit of 50 per cent could be increased by a percentage equal to one-half of the ratio of public land to the total land area of the State. Thus, Nevada, with public lands amounting to about 75 per cent of its total area, may be assisted to the extent of fifty plus one half of seventy-five, or 88 per cent; and the percentages for the other States were determined in a similar manner. Only the States in which the unappropriated public land amounts to more than 5 per cent of the total land area benefit by this new provision. These, with the percentages of Federal participation now permissible, are as follows: Arizona, 72.3 per cent; California, 60.1 per cent; Colorado, 56.1 per cent; Idaho, 59.8 per cent; Montana, 56.5 per cent; Nevada, 87.7 per cent; New Mexico, 63.4 per cent; Oklahoma, 55.5 per cent; Oregon, 62.3 per cent; South Dakota, 55.6 per cent; Utah, 78.9 per cent; Washington, 54.4 per cent; and Wyoming, 64.2 per cent.

It will be observed that this more liberal provision does not increase the amount of Federal funds spent in these States, but only the portion of the cost of the roads built that may be paid by the Government.

Prepared April, 1928.

FEDERAL AID AS A ROAD BUILDING POLICY

IS IT AID OR COOPERATION?

Section II

By

Thos. H. MacDonald, Chief,

and

H. S. Fairbank, Assistant to the Chief,

U. S. Bureau of Public Roads

In the first section of this article we explained briefly the nature of the Federal-aid road improvement policy and enumerated some of the outstanding results which have been achieved since it was inaugurated in 1916.

In its inception a measure for the encouragement of State initiative in the development of more adequate highway facilities, it was shown that this original purpose has since given place, by force of the expanding range of highway travel, to the more distinctly Federal object of interstate road improvement.

Since 1921 the Government's participation has been limited to roads which are actually interstate arteries of commerce and communication; and it is this fact that has led those who have followed the changing status of our highways in the last decade to regard as a misnomer the name under which the Federal policy was inaugurated and by which it will probably always be known. In the sense that the term Federal aid is commonly used in other connections the appropriations made by

the Government for road purposes may not now be considered as aid at all. Rather, they represent a necessary Federal provision to accomplish an important Federal object - the improvement of a limited system of main interstate roads.

It is very fitting that these roads should be jointly financed by the States and the Federal Government, because they are at one and the same time the most important roads of the States and the great arteries of the nation, serving both intrastate and interstate traffic to a greater degree than any other roads.

The very large extent to which these highways now serve a distinctly interstate traffic is startlingly revealed by the traffic surveys which the Bureau of Public Roads has made in cooperation with a number of the State highway departments. Many of us, perhaps, still think of the rural roads in the terms of yesterday when they were largely neighborhood affairs, although one need not be a keen observer to have noted the increasing number of the cars one passes on the road that carry strange license tags.

It may be somewhat of a surprise, therefore, to learn that the cooperative traffic survey in Connecticut shows that the main roads of that State - practically identical with the Federal-aid system - now serve an interstate passenger car

1. The first part of the paper is devoted to a discussion of the

the results of the experiments conducted in the laboratory of the

the results of the experiments conducted in the laboratory of the

the results of the experiments conducted in the laboratory of the

the results of the experiments conducted in the laboratory of the

the results of the experiments conducted in the laboratory of the

the results of the experiments conducted in the laboratory of the

the results of the experiments conducted in the laboratory of the

the results of the experiments conducted in the laboratory of the

the results of the experiments conducted in the laboratory of the

the results of the experiments conducted in the laboratory of the

the results of the experiments conducted in the laboratory of the

the results of the experiments conducted in the laboratory of the

the results of the experiments conducted in the laboratory of the

the results of the experiments conducted in the laboratory of the

the results of the experiments conducted in the laboratory of the

the results of the experiments conducted in the laboratory of the

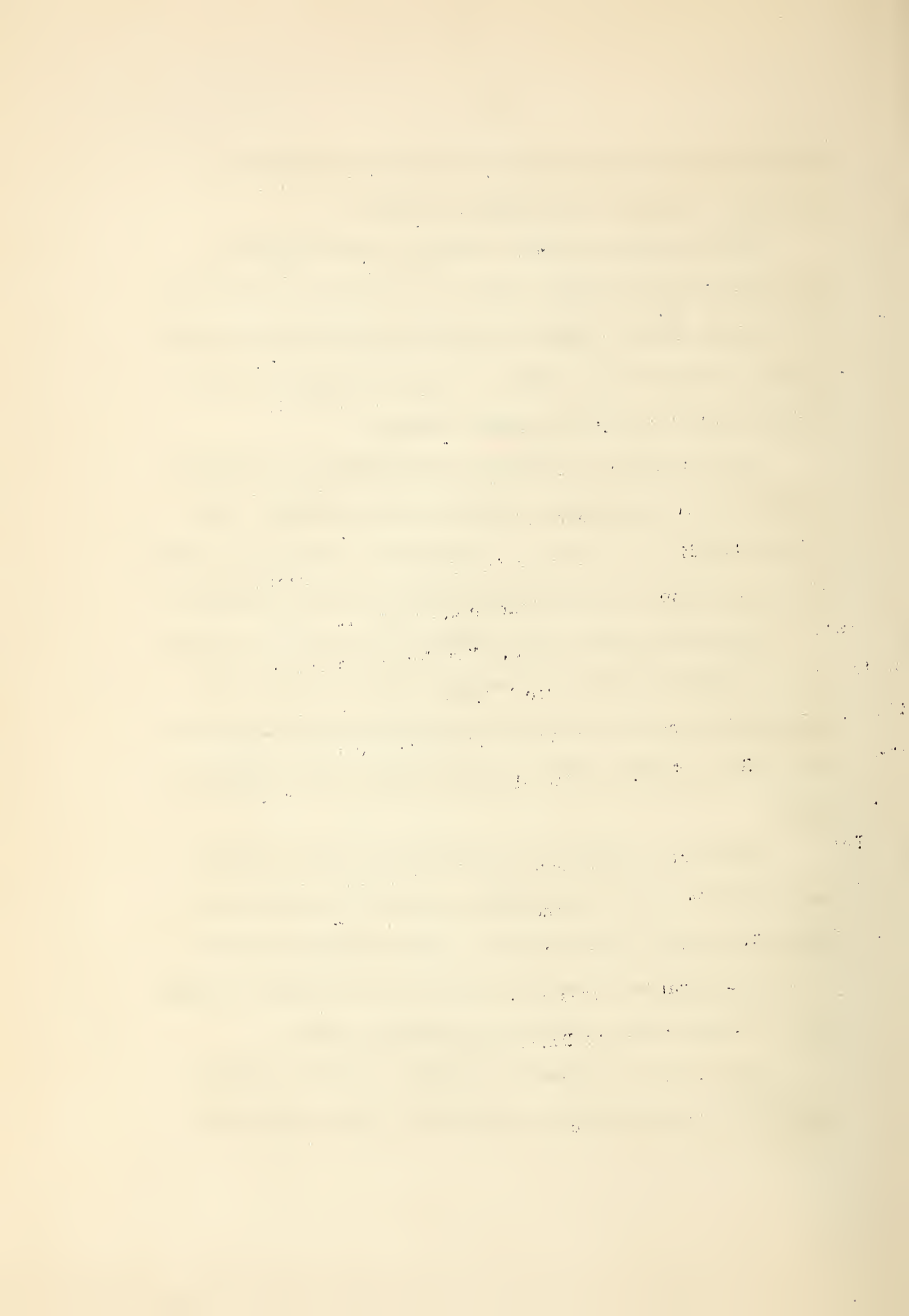
traffic which is more than half of the total utilization of the system, measured in passenger-car-miles.

Similarly the surveys in Vermont and New Hampshire show that during the summer season the resorts of those States draw to their roads a traffic originating beyond their borders which in the case of the former is fully a third, and of the latter a half of the total highway traffic.

To such States as Delaware and New Jersey, the Federal contribution is peculiarly reasonable and essential. Both of these States lie directly in the path of a large and rapidly increasing traffic between metropolitan areas that lie wholly or in large part without their borders. New Jersey is called upon to supply the artery of commerce between New York and Philadelphia, and to carry also a heavy motor traffic from the entire East and Middle West, vacation-bound to her seaside resorts.

Delaware is expected to accommodate on her roads the heavy traffic between Philadelphia and Baltimore and between other points north, south and west of her restricted borders. A very large amount of traffic moves over the Delaware highways which is bound neither from nor to Delaware points.

Thus there is created in the East a situation wherein such States as Massachusetts, Connecticut, Rhode Island, New



Jersey, Delaware, and Maryland, by virtue of their size and position in the eastern tier, are carrying especially heavy burdens as a result of the traffic originating in and destined to their sister States. Others, such as New York and Pennsylvania - of larger area and less directly in the path of the heavy intercity coastal movement - are less heavily burdened with traffic not their own. It is precisely this unequal pressure of interstate traffic that cries aloud for relief and equalization through Federal contribution to the cost of providing the main highway facilities. It is rather remarkable, therefore, that such opposition as there is to continuance of the Federal-aid policy should spring so largely from this section in which the need for the compensation it offers is so clear.

In the West there has never been a doubt of the wisdom and justice or the outright necessity of Federal cooperation. Especially in the intermountain States, where a sparse population is faced with the obligation of building a vast mileage of roads, much of it through Federal lands that can not be taxed by the States, and of building these roads for the accommodation of a traffic which in very large part originates elsewhere - in these States, especially, there is no doubt whatever of the absolute necessity of Federal cooperation.

The first of these is the fact that the
 government has been unable to secure
 the necessary funds to carry out its
 policy of non-interference in the
 internal affairs of the country.
 The second is the fact that the
 government has been unable to secure
 the necessary funds to carry out its
 policy of non-interference in the
 internal affairs of the country.
 The third is the fact that the
 government has been unable to secure
 the necessary funds to carry out its
 policy of non-interference in the
 internal affairs of the country.
 The fourth is the fact that the
 government has been unable to secure
 the necessary funds to carry out its
 policy of non-interference in the
 internal affairs of the country.
 The fifth is the fact that the
 government has been unable to secure
 the necessary funds to carry out its
 policy of non-interference in the
 internal affairs of the country.
 The sixth is the fact that the
 government has been unable to secure
 the necessary funds to carry out its
 policy of non-interference in the
 internal affairs of the country.
 The seventh is the fact that the
 government has been unable to secure
 the necessary funds to carry out its
 policy of non-interference in the
 internal affairs of the country.
 The eighth is the fact that the
 government has been unable to secure
 the necessary funds to carry out its
 policy of non-interference in the
 internal affairs of the country.
 The ninth is the fact that the
 government has been unable to secure
 the necessary funds to carry out its
 policy of non-interference in the
 internal affairs of the country.
 The tenth is the fact that the
 government has been unable to secure
 the necessary funds to carry out its
 policy of non-interference in the
 internal affairs of the country.

If there is aid extended in either direction they are rather inclined to the belief that it flows from their own State coffers to those of the Federal Treasury, by reason of the expenditures they are forced to make upon roads in the Federal lands thus far inadequately provided for by the Government.

The fact is, of course, that highway traffic has now taken on a decidedly interstate complexion, and the Federal appropriations represent, not aid gratuitously granted to the States, but rather a more or less inadequate compensation for the construction of interstate arteries. At the rate of \$75,000,000 a year - the amount of the Federal provision for several years past - this compensation is about 7 per cent of the country's total expenditure for road construction and maintenance. If the percentage of interstate traffic in all States were known - as it is in those where cooperative traffic surveys have been made - it would be found that the Federal contribution does not adequately compensate for the interstate, or - as it may properly be termed - the Federal use of the roads.

So it is asserted with ample basis we think, that the Federal provision for road construction, called Federal aid, is not aid at all, but a Federal payment for a Federal purpose. It is not a gratuity calculated to break down the independence

and the initiative of the States any more than, let us say, the improvement of rivers, or the building of post offices or army posts, or any other constructive work by the Federal Government within the State jurisdictions is calculated to do so, for no less certainly than these is the Federal cooperation in interstate road construction a necessary Federal activity.

Constitutional Authority Clear

There are doubtless some very able students of government who conscientiously believe that there is no constitutional basis for the Federal Government's participation. Section 8 of Article I of the Constitution, which specifically confers upon Congress the power "to establish post offices and post roads", they appear to regard as a limited authorization to lay out and build only a certain class of roads, viz., those over which the United States mails are carried. It was a concession to this view that limited expenditure under the original Federal-aid Road Act to "post roads". That there was, in fact, no limitation at all is attested by the fact that, according to the certificate of the Postmaster General, on January 1, 1927, there were rural delivery routes aggregating 1,278,424 miles in length. So when the Federal Highway Act was framed in 1921 it was the conscious purpose of the framers to restrict, rather than extend the mileage of interest to the Federal Government, which

resulted in the adoption of the 7 per cent basis with its maximum limitation of 200,000 miles.

The fact that, entirely aside from its reasonableness as a limit upon the road activities of the Federal Government, the definition of "post roads" as roads which carry the mails or have anything whatever to do with the mails, was entirely foreign to the intentions of the framers of the Constitution seems to have completely escaped most people. That "post roads" now means roads over which the mails are carried is the result of one of those curious inversions of the meaning of words which frequently occur over long periods as a consequence of changing habits and customs. The original "post roads" were the highways over which journeys were made of such length as to necessitate accommodations for the changing of horses and the over-night lodging of travelers. To provide those accommodations post houses or inns were established at convenient intervals and the roads took their name from these posts. There is not the least doubt that this was the conception of a post road that was in the minds of the framers of the Constitution when they empowered Congress to establish post roads. By reason of the fact that the carriage of parcels and packets necessarily took place over the post roads, the public agency which performed that service became the postal service, and the stations already established for other purposes naturally became the post offices.

So when we undertake to determine the meaning of the constitutional authority of the Federal Government with respect to road establishment we must bear in mind that the post roads referred to in Article I did not derive their designation from their connection with mail carriage, but, on the contrary, our postal service is so called because it originally operated over the post roads.

A similar substitution of one idea for another is seen in the altered significance of the word turnpike. Originally the gate set up to halt travelers for the payment of toll, this interesting word became later the customary name of the toll road itself, and now is commonly used in connection with any main highway whether it be a toll road or not.

What The Founding Fathers Thought

If there were any doubt whether those who drafted the Constitution did harbor a thought of excluding from the duties and powers of the Federal Government, the duty and power of road construction, that doubt would be quickly resolved by examination of the writings of the founders of the Republic.

To mention two only, and those the great exponents of the two extreme points of view with regard to the extent of the Federal authority, there was complete agreement between Thomas Jefferson and Alexander Hamilton; and both looked upon road construction as a necessary Federal function.

Jefferson, writing to James Ross in 1786, said: "I experience great satisfaction at seeing my country proceed to facilitate the intercommunications of its several parts by opening rivers, canals, and roads. How much more rational is this disposal of public money than that of waging war."

Alexander Hamilton, commenting on December 24, 1801, on Jefferson's message to Congress, said:

"In addition to objects of national security, there are many purposes of great public utility to which the revenues in question might be applied. The improvement of the communications between the different parts of our country is an object well worthy of the national purse, and one which would abundantly repay to labor the portion of its earnings, which may have been borrowed for the purpose. To provide roads and bridges is within the direct purview of the Constitution."

If, in the face of these evidences of the thought of the fathers, there were still a doubt as to the constitutional intention, it would certainly be set at rest by the fact that while the great majority of the Constitution makers were still alive, the Nation plunged energetically into the expensive enterprise of building the National Pike.

There are, of course, those rather shallow objectors who assume that, because for eighty years the Government did not take

part in the construction of roads, it is not empowered to do so. As well might they assume that the States have no authority to build roads because for fifty years they left that function strictly to the counties. The fact, in both instances, is simply that the function was not exercised because in that middle period of the country's growth, the railroads alone could meet the requirements of long-distance communication and roads were of such local concern that the only agencies that could appropriately devote their attention to them were the county governing bodies. The motor vehicle has very decidedly altered conditions, and the State and National Governments have simply resumed the exercise of the legal and constitutional functions,

No Extravagance

By some, the plan has been attacked on the ground that the Federal expenditures are excessive. Others fear that it will encourage the States in an extravagant expansion of their road expenditures. Of the several objections raised against the Federal-aid policy as it applies to road construction these are the weakest, because they are denied by the bare figures.

If the Federal expenditures for the purpose are excessive, then any expenditure at all would be too great, for the largest highway expenditure in any year has been only 2 per cent of the total expenditure by the Government. In the eleven years since

1. The first part of the paper is devoted to the study of the properties of the function $f(x)$ defined by the equation

$$f(x) = \int_0^x \frac{1}{1+t^2} dt$$

It is shown that the function $f(x)$ is increasing and concave down on the interval $(-\infty, \infty)$. Moreover, the function has horizontal asymptotes at $y = \pm \frac{\pi}{2}$.

In the second part of the paper, we consider the function $g(x)$ defined by the equation

$$g(x) = \int_0^x \frac{t}{1+t^2} dt$$

It is shown that the function $g(x)$ is an odd function and that it has a horizontal asymptote at $y = \frac{\pi}{2}$ as $x \rightarrow \infty$.

Finally, in the third part of the paper, we study the function $h(x)$ defined by the equation

$$h(x) = \int_0^x \frac{1}{1+t^4} dt$$

It is shown that the function $h(x)$ is an even function and that it has horizontal asymptotes at $y = \pm \frac{\pi}{2\sqrt{2}}$ as $x \rightarrow \pm\infty$.

work was begun the total cost to the Government of the roads completed has been \$601,772,000, and in less than that time purchasers of motor vehicles to be used on the roads have paid into the Federal Treasury in excise taxes on their cars the sum of \$1,100,000,000. In no single year has the amount spent by the Government exceeded 10 per cent of the country's total expenditure for highways, and the average for the period is less than 8 per cent, a ratio which, as previously explained, is considerably less than the percentage of interstate traffic.

As to the fear that the Federal offer will cause the States to expand their expenditures unduly, it may be sufficient to add that after matching the Federal expenditures more than dollar for dollar the highway departments of the several States spent in 1926 nearly \$453,000,000 on purely State work. In other words the States are already spending eight times as much as the Federal Government now appropriates. In view of that fact there is clearly no immediate danger that the Federal contribution will encourage undue expansion of the program.

Thus, without further explanation, the bare figures of Federal and State expenditure refute the suggestion that the Government's expenditure is excessive, and prove that it can not be held responsible for extravagant expenditure by the States.

1

What Is Extravagance In Highway Expenditures?

In this connection it may be proper to inquire what expenditure could rightly be considered as extravagant. Public expenditures for road construction are investments. They are not expenditures at all. The money is simply converted into grades and road surfaces, and these so facilitate the movement of vehicles and so greatly reduce the operating costs of highway transportation that the sums invested in the roads are returned to the public, with very considerable increase, in the saving of transportation costs. When viewed in this light, one is almost prepared to say that no possible expenditure for road improvement could rightly be regarded as extravagant.

The expenditures now being made for road improvement by the States and the Federal Government, to repeat the words of Alexander Hamilton, "abundantly repay to labor the portion of its earnings, which may have been borrowed for the purpose." When they were written by Hamilton those words constituted a statement of well grounded belief. Today they are a theorem proved, and proved beyond the shadow of a doubt by the experiments of T. R. Agg at the Iowa State College of Agriculture and the Mechanic Arts.*

* Take a mile of typical earth road, unsurfaced. Operate over it 1,000 vehicles a day and maintain it as well as possible

...the ...
...the ...

...the ...
...the ...
...the ...
...the ...
...the ...

...the ...
...the ...
...the ...

...the ...
...the ...

...the ...
...the ...

...the ...
...the ...

...the ...
...the ...

...the ...
...the ...

under that traffic for a year. The combined costs of maintaining the mile of road and operating vehicles over it will amount to approximately \$52,000 in the year, and travel will be almost impossible at certain seasons.

Surface the same road with a concrete pavement. Operate over it the same traffic of 1,000 vehicles a day and maintain it under the traffic as before. Charge off the entire cost of surfacing in the life of the pavement with interest at 4 per cent and add the annual cost of the surface thus obtained to the maintenance cost. The combined costs of the mile of road and its maintenance and the operation of vehicles over it will amount to approximately \$49,000 in the year, less by \$3,000 than the cost of the earth road, and the road in this case will be in perfect condition throughout the year.

Hence, for the traffic of 1,000 vehicles per day transportation over the concrete road costs less than over the unsurfaced earth road. For heavier traffic the difference in favor of the surfaced road is greater.

This illustration is based on the experiments of T. R. Agg of the Iowa State College of Agriculture and the Mechanic Arts, reported in Bulletin 65, of the Iowa Engineering Experiment Station.

Federal Aid Apportionment

Consistent with Traffic Requirements

That the apportionment of the Federal appropriations is remarkably consistent with the need of the several States as measured by the requirements of their traffic is a fact that is the more notable because the basis of apportionment does not involve a consideration of the traffic.

The real measure of the magnitude of the Government's contribution to any State is not the gross amount of Federal money placed to the State's credit, but rather the amount apportioned to it per mile of the Federal-aid system within its borders. Thus, the total amount apportioned to Texas since 1917 now stands at \$49,606,279, whereas little Delaware has a total apportionment of only \$3,205,308. But, if we divide these figures by the mileage of the respective sections of the Federal-aid system, we find that the Texas apportionment provides only \$3,880 for each mile, whereas Delaware has benefited to the extent of \$12,050 per mile. Obviously the apportionment to Delaware permits the construction of much more expensive roads than is possible in Texas; or, at least, it permits the Government to share more generously in the cost of whatever types of improvement may be required and adopted.

From this example it will be clear that the amount of the apportionment per mile of the system is a reasonable measure of the extent of the Government's financial provision. Exactly how adequate this provision is in each case can only be determined by a study of the types of improvement required on each section of highway as determined by the traffic carried. For purposes of the present discussion such an analysis is not possible; but there is a simpler criterion which will give a very fair idea of the general conditions.

It has been found wherever there are parallel records of motor vehicle registration and highway traffic, that the two increase in direct proportion. This would naturally be assumed to be the case, since highway traffic is now almost exclusively motorized and since the number of vehicles used on the roads must depend on the number there are to use. But we do not have to make assumptions; the fact is proved by actual records of registration and traffic over the same period of years in a number of States. So, therefore, for purposes of general discussion we may safely accept the number of registered motor vehicles per mile of Federal-aid system in each State as a reasonable criterion of the probable density of traffic and, therefore, of the highway requirements.

We then have, on the one hand, the amount of Federal aid apportioned per mile of system as a measure of the degree of the Federal provision, and, on the other, the motor vehicle registration per mile as a measure of the provision needed. For purposes of ready comparison these two criteria for each State are listed in parallel columns in the following table, in which the States in each column are arranged in the descending order of the figures.

Federal-aid apportionments per mile of limiting 7 per cent system compared with motor vehicle registrations per mile of the same system, by States.*

| State | Federal-aid apportionment 1917-1929, per mile of 7 per cent system | State | Motor vehicle registration 1926, per mile of 7 per cent system |
|------------------|--|-------------------|--|
| 1. Rhode Island | \$ 20,450 | 1. Rhode Island | 667 |
| 2. Delaware | 12,050 | 2. New Jersey | 543 |
| 3. New Jersey | 8,630 | 3. Massachusetts | 480 |
| 4. Massachusetts | 8,550 | 4. California | 326 |
| 5. Arizona | 7,830 | 5. New York | 317 |
| 6. New York | 7,200 | 6. Connecticut | 314 |
| 7. Nevada | 6,950 | 7. Ohio | 250 |
| 8. Maryland | 6,930 | 8. Maryland | 244 |
| 9. Connecticut | 6,290 | 9. Pennsylvania | 231 |
| 10. Pennsylvania | 6,040 | 10. Michigan | 213 |
| 11. Utah | 5,650 | 11. Florida | 208 |
| 12. California | 5,530 | 12. Illinois | 202 |
| 13. Illinois | 5,330 | 13. Delaware | 169 |
| 14. Ohio | 5,300 | 14. Indiana | 155 |
| 15. Florida | 5,120 | 15. Washington | 122 |
| 16. Maine | 4,850 | 16. Wisconsin | 120 |
| 17. Michigan | 4,710 | 17. West Virginia | 103 |

| State | Federal-aid apportionment 1917-1929, per mile of 7 per cent system | State | Motor vehicle registration 1926, per mile of 7 per cent system |
|--------------------|--|--------------------|--|
| 18. North Carolina | 4,550 | 18. Maine | 94 |
| 19. Oregon | 4,530 | 19. North Carolina | 92 |
| 20. Colorado | 4,490 | 20. Iowa | 91 |
| 21. Indiana | 4,450 | 21. New Hampshire | 90 |
| 22. Alabama | 4,400 | 22. Minnesota | 88 |
| 23. Virginia | 4,380 | 23. Virginia | 86 |
| 24. Kentucky | 4,330 | 24. Louisiana | 85 |
| 25. Washington | 4,190 | 25. Missouri | 84 |
| 26. Louisiana | 4,050 | 26. Texas | 82 |
| 27. West Virginia | 4,030 | 27. Oregon | 80 |
| 28. New Mexico | 4,000 | 28. Kentucky | 76 |
| 29. Tennessee | 4,000 | 29. Colorado | 74 |
| 30. Mississippi | 3,970 | 30. Vermont | 71 |
| 31. New Hampshire | 3,950 | 31. Nebraska | 65 |
| 32. Georgia | 3,940 | 32. Oklahoma | 63 |
| 33. Texas | 3,880 | 33. Tennessee | 61 |
| 34. Wisconsin | 3,840 | 34. Alabama | 57 |
| 35. Vermont | 3,830 | 35. Kansas | 57 |
| 36. Idaho | 3,710 | 36. Mississippi | 55 |
| 37. Missouri | 3,520 | 37. Utah | 51 |
| 38. Montana | 3,520 | 38. Arizona | 49 |
| 39. Minnesota | 3,300 | 39. Georgia | 49 |
| 40. South Carolina | 3,250 | 40. South Carolina | 49 |
| 41. Wyoming | 3,220 | 41. Arkansas | 42 |
| 42. Nebraska | 3,170 | 42. Idaho | 34 |
| 43. Iowa | 3,080 | 43. Montana | 22 |
| 44. Arkansas | 2,810 | 44. North Dakota | 21 |
| 45. Kansas | 2,710 | 45. South Dakota | 21 |
| 46. Oklahoma | 2,480 | 46. New Mexico | 17 |
| 47. North Dakota | 1,770 | 47. Nevada | 16 |
| 48. South Dakota | 1,690 | 48. Wyoming | 15 |

* As the mileage used as the basis of comparison is 7 per cent of the total road mileage in each State, the order would be unchanged if the total mileage were used.

Examining this table, the first thing that strikes the eye is the very remarkable parallelism in the general order of the States in the two columns. Generally speaking, those near the top in the first column are also near the top in the second; and those near the bottom in one column are also near the bottom in the other.

Small States Compensated For Interstate Traffic Burden

It will be noted that those small Eastern States in which, as previously pointed out, the interstate traffic is a relatively large part of the total, without exception are properly compensated for the use of their roads by the citizens of other States. Every one of these States - Rhode Island, Delaware, New Jersey, Massachusetts, Maryland, Connecticut - is within ten places of the top of the list. All are Eastern States, and all are undeniably entitled to heavy compensation.

It will be observed also that, generally speaking, those States in which traffic reaches the highest density, as indicated by the number of registered motor vehicles per mile, and verified by our general knowledge of traffic conditions, receive apportionments per mile which are calculated to permit the construction of the kind of roads required by the traffic.

All the Atlantic Coast States from Maine to North Carolina, the State of Florida, all States of the East North Central group

THE UNIVERSITY OF CHICAGO

THE DIVISION OF THE PHYSICAL SCIENCES

DEPARTMENT OF CHEMISTRY

RECEIVED

1957

FROM

DR. J. H. DILLON

1000

1000

1000

1000

1000

1000

1000

1000

1000

1000

1000

1000

1000

1000

1000

from Ohio to Illinois, and all Pacific Coast States, nineteen in number, fall within the first twenty-five places of the top in the apportionment column. These are the States which from our general knowledge we would unquestionably rate as those of heaviest traffic. Notice how the general judgment is corroborated by the motor vehicle registration per mile and how in this classification these same States fall within the first twenty-seven places of the top. Maine, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Maryland, Delaware, Virginia, North Carolina, Florida, Ohio, Michigan, Indiana, Illinois, Washington, Oregon, and California, all of them States in which traffic is known to be exceptionally heavy are so indicated by the registration of vehicles per mile, and all are among the leading States in the order of their Federal-aid apportionments per mile.

Public Land States Compensated

Test the comparison in still another way. Recall that it is one of the purposes of the Federal-aid policy to compensate the Western States in which there are large areas of public lands for the construction of roads through these non-taxable areas. Then notice how these States - Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oklahoma, Oregon, South Dakota,

Utah, Washington, and Wyoming - with four exceptions, receive apportionments per mile which give them higher rank in the apportionment column than the position to which they are entitled on the basis of their relative traffic density.

It may be thought that some of these States fare a little too well. There is equal ground for the complaint that some are not adequately compensated. It is not contended that there are not certain inequities in the method of apportionment. The wonder is that the more or less arbitrary basis is on the whole so equitable. But before we conclude that these Western States are too generously aided, it should be recalled that the apportionments to these States are expected to pay more than half the cost of the road construction; and that they differ in this respect from all other States. Because of this fact the public land State apportionments when matched by the State funds at the permissible percentage produce a total which is less than twice the Federal contribution. Consequently, a dollar of Federal money in these States does not produce as much road value as in the other States. In comparing these apportionments with the corresponding registrations per mile to determine their adequacy to the traffic it is therefore necessary to take into account the ratio of the Federal to State funds.

Prepared April, 1928

FEDERAL AID AS A ROAD BUILDING POLICY

DO SOME STATES PAY MORE THAN THEY RECEIVE?

Section III

By Thos. H. MacDonald, Chief,
and
H. S. Fairbank, Assistant to the Chief,
U. S. Bureau of Public Roads

In the preceding sections of this article we have explained the operations of the Federal-aid plan of highway improvement, and pointed out that the participation of the Federal Government under the conditions of highway transport at present prevailing is in no sense to be considered as gratuitous aid to the States. On the contrary, it is an effort to accomplish a distinctly Federal purpose - the balanced improvement of a limited interstate highway system, and to do so cooperatively with the States whose interests in the selected system are equal to the Government's.

It has been shown that this Federal activity, is not as some have contended an invasion of the functions of the States; that it is thoroughly constitutional; and that the apportionment of the Federal appropriations among the several States, under the statutory prescription is remarkably in accord with the need for expenditure as indicated by the varying density of traffic on the sections of the system within the respective States.

By the traffic test - the only proper one - some of the States are found to fare somewhat more fortunately than others

(1)
in the Federal apportionment; but without exception the States which the principal opponents of the Federal-aid policy believe to be inadequately aided are shown by this test to benefit by the Federal appropriations in reasonable proportion to their relative needs.

It is the contention of these opponents - a small group - that no State should receive a lesser proportion of the Federal road appropriations than the proportion of the total internal revenue it pays into the Federal Treasury.

Those that hold this view fail to grasp, or ignore, the interstate significance of the Federal highway expenditures; they disregard the common benefit of all the States in having a well articulated interstate system of highway communication; they ignore the fact that Federal taxes are collected and disbursed to accomplish Federal purposes and that they are paid by individuals as citizens of the United States and not by the States or by their residents as citizens of the States. They regard these considerations as of no force and hold to the simple doctrine that no State should be required to pay for improvements made beyond its own borders.

The majority of those objectors have the State of New York in mind. More than a fourth of the total amount of internal revenue is collected in that State, and it receives of

the Federal-aid appropriations only a twentieth. It is claimed that this is conspicuously unjust. But, if there is merit in the principle at all, then all States in which the revenue collected is a greater proportion of the total than the proportion of the Federal-aid appropriations they receive, are also unjustly treated.

The States which, on this basis must be included with New York, are shown in the following tabulation with the percentages of the internal revenue collected in them and the percentages of the Federal-aid appropriations they receive. All other States receive a percentage of the Federal road appropriations greater than the percentage of the internal revenue collected from them,

| State | Percentage of Internal Revenue Receipts, fiscal year, 1927 | Percentage Federal-aid apportionment fiscal year, 1929 |
|----------------|---|--|
| California | 4.87 | 3.40 |
| Connecticut | 1.26 | .65 |
| Delaware | .54 | .50 |
| Florida | 1.55 | 1.23 |
| Illinois | 7.59 | 4.29 |
| Maryland | 1.13 | .87 |
| Massachusetts | 4.00 | 1.49 |
| Michigan | 6.91 | 3.02 |
| New Jersey | 3.98 | 1.28 |
| New York | 26.35 | 4.96 |
| North Carolina | 7.18 | 2.35 |
| Ohio | 5.14 | 3.77 |
| Pennsylvania | 9.03 | 4.56 |
| Virginia | <u>2.76</u> | <u>1.97</u> |
| Total | 82.29 | 34.34 |

As shown by the table, over 82 per cent of the total internal revenue for the fiscal year 1927 was collected in these fourteen States, and the same States received only 34 per cent of the Federal-aid apportionment for the fiscal year 1929. Those who object to this situation do so on the ground that the States are entitled to a return of Federal appropriations in the same ratio as their tax collections.

What is wrong with this objection? Perhaps the best answer to that question is to see what would happen if the basis of apportionment were revised accordingly. If that were done the fourteen States listed would receive 82.29 per cent of all Federal-aid road appropriations, and if the revised basis had been established with the first appropriation, by now they would have received \$674,000,000 of the total of \$817,625,000 thus far apportioned. Since the aggregate length of the 7 per cent system in these States is 49,509 miles, their apportionments to date, if they had been made on this basis, would amount to an average of \$13,600 a mile, whereas the other 34 States would have received only \$950 for each of the 151,054 miles of the remainder of the 7 per cent system. Obviously such an apportionment would be wholly inconsistent with the relative highway requirements of the two groups of States.

New York vs. Pennsylvania

But, perhaps we can show the defect of the proposal still more clearly by comparing two States in the group from which there are large tax collections. Suppose we take New York and Pennsylvania. They are neighboring States. The character and weight of their traffic is much the same. The same kind of road improvement is required in each State; and practically the same kind is being provided. On the existing basis of apportionment New York has received to date \$7,200 per mile of its system and Pennsylvania has received \$6,040 per mile, amounts which are very consistent with the respective requirements. But, if each State had shared only in the proportion of the taxes collected in them, New York would have received by this time nearly \$38,000 for each mile of its 7 per cent system and Pennsylvania would have received less than \$12,000 per mile for the improvement of its system.

Apply another test. If the Federal revenues should be expended only in the States from which they are collected, then, presumably, they should be expended in only those parts of the States from which they are collected. Let us see what would happen to New York if the argument were followed to this logical conclusion. The internal revenue taxes are collected in New York at six offices, of which one is in Brooklyn, two are on Manhattan

Island, one in Albany, one in Syracuse and one in Buffalo. The total tax collected by these six offices in the fiscal year 1927 was \$755,079,237.01. Of this sum the three offices in the City of Greater New York collected \$627,478,603.93, every penny of which was collected within the city limits where there are no Federal-aid roads at all; and the other offices collected from the rest of the State only \$127,600,633.08, an amount which is only 4.5 per cent of the total for the country at large. If an equal percentage of the Federal-aid appropriations had been apportioned to the State from the beginning of the work it would have received by now only \$36,800,000, or approximately \$6,400 per mile of its 7 per cent system. Actually the State has received \$7,200 per mile on the existing basis.

Of course, those who complain that this or that State pays more than it receives utterly ignore the national objects of the expenditure - the connection of State with State, the construction of transcontinental highways over the mountain passes and across the desert spaces of the West, the building of roads for national defense. They overlook the fact that from the national point of view the need for Federal expenditure is not gauged at all by the wealth of the States nor by their tax contributions, but rather by the area to be spanned,

and the mileage to be built, and the traffic to be accomadated. All these things they fail to take account of; and insist only that if there is to be any Federal expenditure at all, no State should benefit in lesser proportion than the percentage of internal revenue collected from it.

Internal Revenue Not Paid Where Collected

Assuming that the general premise were sound, the statistical basis upon which the effort is made to show that certain States are taxed beyond the return they receive is grossly misleading.

Those opposed to the Federal-aid policy on this ground assume that the internal revenue collections reported as received from the several States represent taxes paid by the citizens of the respective States. The assumption is incorrect.

There are several varities of internal revenue, of which the following are the principal forms: Income taxes of individuals and corporations; taxes on estates; taxes on distilled spirits and alcoholic beverages; taxes on tobacco and tobacco manufacturers; taxes on oleomargarine and adulterated or renovated butter; stamp taxes on stocks and bonds and playing cards; manufacturers' excise taxes on motor vehicles, pistols, and cereal beverages, narcotic taxes; and taxes on

theatre admissions and club dues. Of these several kinds of taxes the only ones which it is safe to assume are paid by citizens of the States in which they are collected, are the individual income taxes and the taxes on theatre tickets and club dues.

The corporation income taxes are collected wherever the business offices of the corporations may be but they are ultimately paid by the stockholders whose homes may be, and often are far removed from the place of tax collection. The taxes on various kinds of manufactured articles and commodities are collected where the manufacturers have their offices. They are ultimately paid by consumers all over the land. Even the estate taxes may often be paid by legatees residing elsewhere than the State in which the taxes are collected.

If the internal revenue collections of the various States are examined with these facts in mind it becomes apparent at once that there are wide differences between the amounts collected in each of the States and the amounts paid by their citizens.

For example: Two of the fourteen States listed above as showing a percentage of internal revenue receipts greater than their respective percentages of Federal-aid apportionment, are North Carolina and Virginia. The total receipts from North Carolina in the fiscal year 1927 were \$205,651,675, an amount

that was exceeded only by the receipts from New York, Pennsylvania, and Illinois. It represented over 7 per cent of the total receipts from the entire country, whereas the percentage of Federal-aid apportionment to the State was only 2.35. On examining the source of these receipts, however, we find that they include tobacco taxes of \$185,941,504 which, although they are collected in the State, are actually paid by consumers in every State. This amount should obviously not be credited to North Carolina, and if it is deducted the balance - which still includes some revenue for which the State should not be credited - is less than one per cent of the total internal revenue collected during the year, a proportion considerably less than the State's Federal-aid percentage.

A similar examination of the Virginia receipts shows that the tobacco tax produces nearly \$58,000,000 of the State's total receipts of a little over \$79,000,000; and the balance is less than one per cent of the total internal revenue, whereas the Federal-aid apportionment percentage is 1.97.

Clearly, therefore, it may not be asserted that the citizens of these two States pay in greater proportion than they receive, although from the bare statistics it would appear that they do.

The Case of Michigan

Michigan is another of the States that appear to pay more heavily than they benefit. Its internal revenue collections in 1927 amounted to nearly \$198,000,000, or nearly 7 per cent of the total, whereas its apportionment of Federal aid is only 3 per cent. But, on examination of the sources of the revenue, we find that it includes over \$48,000,000 of excise taxes on motor vehicles and nearly \$4,000,000 of tobacco taxes, the ultimate payment of which is by citizens of many States. We find also that the corporation income taxes are more than half of the total, and without question a large part of this portion of the receipts consists of taxes on the income of motor vehicle manufacturing concerns, which are really paid by the widely scattered stockholders in these great corporations. A very large part of the individual income taxes of \$38,000,000 is paid by the Fords, father and son. The exact amount of their tax in 1927 is not readily available. In 1923 it was more than \$21,000,000. If all deductions here indicated could be made in order to get at the amount actually paid by the citizens of Michigan it is more than probable that it would be found that they pay no more than their proportional per capita share and no more than the percentage of Federal aid they receive.

Similiarly we might go through the list of the fourteen States which appear, on the face of the tax records, to pay more than their fair share of the Federal revenue, and show pretty conclusively that, when the revenue credited to them is stripped of the items which are ultimately diffused, the amount actually paid by the citizens of each of the States is little if at all greater in proportion to the total than the share of the Federal-aid appropriations they receive.

With the possible exception of Florida the remaining States of the fourteen - California, Connecticut, Illinois, Maryland, Massachusetts, New Jersey, New York, Ohio, and Pennsylvania - include or share directly in the influence of the great national financial and business centers - New York, Chicago, Philadelphia, Cleveland, Boston, Baltimore, San Francisco, and Los Angeles. In these cities and a few others are our great financial institutions and the head offices of the great national commercial organizations, and in them are paid the taxes which are based upon the wealth of a large part of the nation and which ultimately are borne by the real owners of that wealth wherever they reside; and their homes are every where.

What Does New York Really Pay?

Take New York as the outstanding example. It apparently pays more than 26 per cent of the total internal revenue; but without the city of New York the State's contribution would be only 4.5 per cent of the total - less by a half of one per cent than the Federal-aid percentage. The mere chance of location which places New York City on the east bank of the Hudson River instead of the west gives to the credit of the State of New York instead of the State of New Jersey the revenue tax returns which in fact are ultimately paid by citizens of the United States residing in every one of the 48 States.

How true this statement is may be illustrated by a few specific examples to show how widely distributed are the owners of the corporations which pay their Federal taxes in New York, and how far removed from that State, in many instances, are the sources of the wealth taxed. The facts are taken from an analysis by W. C. Markham, executive secretary of the American Association of State Highway Officials, and relate to the situation in 1924.

First there is the United States Steel Corporation with 145 plants and warehouses, only two of which are in New York State. There are more than 153,000 stockholders resident in all States and possessions of the United States - more of them in Pennsylvania than in New York.

There is the Union Pacific Railroad. It has no lines east of Omaha, and its stockholders live in many States; but it pays its taxes in New York City. The Southern Pacific, another western road, also pays its taxes in New York although its stockholders are everywhere and it has not a mile of track nearer to New York than New Orleans.

And then there are these others, the mere mention of which will be sufficient to show that the taxes that they pay are not based on earnings in the State of New York. There are the American Railway Express; the American Beet Sugar Company; the American Can Company; the American Locomotive Company; the American Radiator Company; the American Smelting and Refining Company, whose smelters are in Colorado, Utah, Washington, California, Montana, Texas, Arizona, Maryland, Illinois, Nebraska, Oklahoma, New Jersey, and almost everywhere except New York. The stockholders of these concerns reside in practically every State; and so do those of the American Sugar Refining Company; the American Telephone and Telegraph Company; the American Tobacco Company; the Anaconda Copper Mining Company, the National Biscuit Company; the National Lead Company; the Sinclair Consolidated Oil Corporation; the Union Tank Car Company; the Woolworth Company; the Western Union Telegraph Company; and a great many others.

It will be unnecessary, perhaps, to add further proof that the Federal taxes collected in New York are in reality paid on the income of a very large part of the population of the United States resident in every State; and what is true of New York is true, in lesser degree, of the other States in which there are great financial and industrial centers. It is a false theory which assumes that States contribute to the Federal Treasury. The Federal taxes are paid finally by individuals all over the land who, wherever they may live, are citizens of the United States. They pay their taxes to meet Federal needs, and the improvement of the Federal-aid highway system is such a need.

The basis of Federal-aid apportionment, recognizes differences in the area of the several States; it recognizes differences in the mileage of road required to span their respective areas; and, by taking account of differences in population, it recognizes differences in degree of highway usage which are dependent upon density of population. It has been tested by over 10 years of operation and has been modified as experience has indicated the need. Doubtless it could be improved by further modification; but, generally speaking, it has met the requirements.

Other Objections Answered

Descending to a lower plane of criticism, we meet the claim that some of the States have built their own roads with their own money and need no Federal aid, and this is coupled with the suggestion that the others should "go and do likewise". This claim involves first, the assumption that the Federal appropriation is a gratuity toward the accomplishment of improvements of benefit to the individual States; and this assumption has been shown to be incorrect. It involves also another assumption - equally incorrect - that roads are improved once for all time, whereas the experience of a quarter of a century shows conclusively that improvements must be a continuous process if our highways are to be kept adequate for the constantly growing traffic. However, the complete answer to this claim is this: That the States that are assumed to have built their roads are still spending large sums for road building; that with the exception of the three smallest no State has yet adequately improved its entire 7 per cent system; and that all States, without exception, are absorbing the Federal apportionments in the making of needed improvements.

And, finally, we come to these other related objections that the policy is paternalistic, that it is an unwarranted Federal infringement upon State authority; that its administration

is bureaucratic and not amendable to the will of the people, and that it fastens upon the taxpayers the burden of maintaining an army of Federal jobholders. As to the first two points of the indictment, we believe the answer has already been given.

With regard to the others we will merely point out:

1. That the law itself places the initiative in all matters in the hands of the State highway departments, reserving to the Federal Administration only such authority as is necessary to assure a reasonable coordination of effort toward the accomplishment of the Federal objective of a completely improved interstate highway system.
2. That there has been a studied effort to accommodate the administration of the law to the particular circumstances of each State, by decentralization of authority and the avoidance of impracticable general standards.
3. That every major administrative policy has had the support of the American Association of State Highway Officials the national organization of State highway executives and engineers; and
4. That of every dollar of Federal money appropriated $97\frac{1}{2}$ cents goes into the labor and materials of actual

road construction, and the other $2\frac{1}{2}$ cents not only pays the entire cost of the Federal-aid road administration, but also supports the research activities of the Bureau of Public Roads.

How successfully the Federal administration has accomplished the aims which it has set for itself, and whether or not its stewardship has been efficient and effective; those questions we leave to others to judge.

| | |
|-----|----------------------------------|
| 1.9 | <i>AUTHOR</i> MacDonald, T.H. |
|-----|----------------------------------|

AUTHOR

MacDonald, T.H.

R5ZFa.

TITLE

Federal Aid as Policy.

Form 172

Form 172

